Science and the Scriptures.

A

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BY THE

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As Poets and Astronomers have fancied among the celestial lights, bears, bulls, doggs, scorpions, and other beasts, so our adversaries impute I know not what imaginary deformities, to a book ennobled by its author with many celestial lights, and fit to instruct the world, and discover to them the ways of truth and blessedness.——Boyle.—*Considerations Touching the Style of the Holy Scriptures.*

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DISCOURSE.

Among the intellectual phenomena of our age, its scientific aspect is quite conspicuous. We live in the midst of a general and high development of knowledge; the age is scientific. The remark is not less true, but rather more so, if we recur to the etymology of the word scientific,—science-producing. Almost every decade of the present century has witnessed the birth of a new science. The oldest and most advanced of sciences, has received its largest expansion at the most recent period; and has but now made its way to that field of the sidereal heavens, which is to be the grandest theatre of its achievements. The most recent and comprehensive of sciences, geology, is the creation of our own generation; and is even yet, with all its ample array of observations, scarce at its maturity. The multiplication, too, of scientific observers, is an equally characteristic circumstance of this development; and one which lies at the basis of much of the extension, and much of the authority, of science in our day. Science is thus advancing with unparalleled rapidity, —the array of distinct sciences gives a breadth of investigation before unknown. Hence the conclu-

sions that science announces have an authority which is already very great, and which is increasing as often as a new science gives confirmation to results previously obtained, and as often as a new generation of observers authenticates the facts affirmed by the preceding.

It becomes, in such a state of things, a question of much interest, what is to be the bearing of this extended reception of scientific truth, upon the religious views which we derive from the Scriptures; and it is this topic which I propose as the subject of our present consideration. *What are ultimately to be the relations of scientific and biblical truth?*

The announcement of such a subject will awaken very opposite feelings, in the minds of different classes of hearers. One class will wonder whether, after all the discussions of recent years, the harmony of science with revelation can still be spoken of as incomplete. Their idea of the conflict between these two systems, is, that it extends to the six days of Genesis, and the universal deluge; and that once any tolerable harmony is established at these points, the controversy is forever closed. Another class, chiefly familiar with scientific theories, and deeply imbued with deference to their authority, will be altogether incredulous of any reconciliation of them with the Scriptures. They will regard the discrepancies as too numerous, and too deeply founded in the philosophy of nature, ever to be conformed to the biblical ideas of creation and providence. Both these views are deserving of attention: and the ex-

amination of them will constitute the principal aim of this essay.

I. Let us observe, then, in the first instance, the scope of the controversy—the positions in respect to which the philosophy of science, as given to us by scientific authorities, conflicts with the philosophy of the Bible.

The conflict is not confined to a few points, nor limited to any era of scientific progress. It extends over the whole field of research, and it pertains to every new development of knowledge. Investigation in any new field, brings up views of truth which shock received opinions in morals or in theology. The uniformity of this result hitherto, would seem to indicate it as almost a law of all incipient science. Next, learned controversy essays to point out admissible modifications, on either side, which may remove this aspect of hostility. At length new discoveries are made in science, or new interpretations of Scriptures are suggested, by which the discrepancy is removed, and the desired harmony attained. But when the disputants are settling into a comfortable hope that the question is disposed of forever, behold the very discoveries which furnished the solution are themselves in conflict with some *other* truth,—and involve the necessity of another controversy, to be decided by means equally indecisive. Or, if the controversy is terminated at one point, it breaks out at another. Some new field of investigation is opened, and a new science is created, which, finding its conclusions at variance with the faith, asks the

same kind office of adjustment, and offers similar problems, in the same succession, to our religious philosophy. The work, therefore, can no more be regarded as finished, than the work of science itself can be. As long as any considerable amount of truth remains to be discovered, the same adjustment will be required; till the whole grand system of nature shall have been philosophically explored—the whole theology of the past stringently reduced to the biblical standard—and the Bible itself compared, by the utmost acuteness of the human intellect, with the highest perfection of human knowledge. Such I suppose to be the probable course of this protracted and great inquiry into the scientific validity of man's religious belief.

Such a position may require some defence. It may seem strange that truths which lie fundamentally at the basis of the whole biblical scheme of thought, should be long unsupported by the authority of science—should be open still to scientific question. But a glance at the history of science will show that it has ever been so; and the present aspect of science shows that for a long time it must continue to be so.

This controversy is not a novel one. Active as it may be in our day, the conflict is already one of some centuries. It commenced with the very earliest development of modern science,—the establishment of the Copernican system of astronomy. It might have been supposed that the ample and satisfactory solution of the difficulties then felt in recon-

ciling the scientific view of the heavens with the popular interpretation of the Bible, would have insured the harmony at this point; but every expansion of astronomy has furnished material for new discussion, till the all-absorbing nebular hypothesis of La Place has given to the controversy a breadth which previous generations could not have imagined, and which must postpone its settlement to generations yet in the future. Even geography once incurred serious censure upon theological grounds, for its theory of the antipodes; and such questions as that at rest, geographers might seem at liberty to pursue their researches fearless of any further collision with revelation. But no sooner do they give their science a philosophical form, and study, as they are now very earnestly doing, the natural distribution of plants and animals over the globe, than new questions arise, of agreement or disagreement with the inspired narrative of the manner in which our earth was originally stocked with its organic tribes.

The microscope has opened to our study a world of minute and wonderful organisms, sufficiently remote, it would seem, from common observation, to have escaped all connection with the statements of the Bible. But out of this invisible circle the same questions arise, and within that sphere — which lies beyond the power of unassisted vision — some of the most important of them are to be decided. One of the recent works of Ehrenburgh, — a name that carries with it an authority second to none, in that field — advocates the doctrine of the spontaneous

generation of the microscopic animalcules of the atmosphere, by means of atmospheric agencies alone.

The same position is openly assumed in respect to the lower organisms of the animal and vegetable kingdoms. The occurrence of the Alpine plants of Europe at the remotest point of the Andes, and the wide diffusion of the most humbly organized plants in similar localities throughout the globe, are regarded by this school as facts incapable of explanation, by any other hypothesis than that which affirms their spontaneous organization there.*

Many geologists maintain the same view in their peculiar field, though with a confidence materially diminished by the recent tendencies of investigation. The doctrine of equivocal generation has proved so often a mere impediment to the progress of knowledge, that there is a suspicious character about it, to which they find it impossible to be insensible. It is, however, still maintained by the author just referred to; and is suggested afresh by some important facts of recent, and it would seem very accurate, observation, upon the parasites of some of the higher animals.

*Meyen, an eminent German naturalist, in his work on the "Geography of Plants," makes the following statements: "The exact observations which have been made, prove that nature is still able to create imperfect animals, as well as the lower plants, without seeds or eggs. Only organic matter, water, and air, the essential conditions of living beings, are necessary, with sufficient heat, to produce animal forms." Among inferior plants, the mould which forms upon bread is regarded by this writer as a decisive instance of spontaneous generation; though he deems it difficult to decide, up to what grade of animals and plants this creative energy of nature now reaches. See publications of the Ray Society.

Such a theory may not be incompatible with just ideas of creation; inasmuch as a philosophical mind may equally discern the will, and the power, of an Almighty Creator, through whatever agencies the work of creation may be accomplished. But it removes Him farther from our field of vision. It suggests, too, a similar view of the origin of other organized beings, since it is difficult to believe that the method of creation has not always been the same. It destroys that criterion which has been long regarded as one of the most distinct and reliable characteristics of a species of natural history, viz., the individuals which have descended from a common stock. It involves the idea of a permanent process of creation, since this power of originating in suitable conditions organic structures, is a permanent characteristic of natural agencies. It modifies our views of the unity of the human race, which must of course consist in something else than in descent from a common parent. Our religious views, therefore, of the nature of the creative act in God—of the real relations of the races of mankind to each other, to history and to civilization,—and even of their relations to the common depravity, and the common redemption of mankind, all acknowledge some dependence upon the scientific issue of these questions.

By another class of physical philosophers it has been earnestly held that electricity and magnetism contained the whole mysterious secret of animal life; and these sciences have furnished the basis of fact

for many a theory of materialism and fatalism in respect to the human soul.

In geology, the questions are more numerous. A science which takes cognizance of the whole physical and organic phenomena of the earth,—through a period of indefinite duration, and involving creations and re-creations which now defy all exact enumeration, must repeat the conclusions of every other science, besides maintaining its own. Accordingly we find a great number of scientific opinions demanding adjustment with the Bible, in this field. The absolute age of our planet—the order in which the organic tribes have been called into life upon it—the relation of pre-existing systems of creation to the present, involving the questions of transmutation and development of species—the antiquity of the human race—the place and time of man's appearance upon the earth—the introduction of the existing fauna and flora—these, and many related points of inquiry, have a most obvious and important bearing on the biblical cosmogony.

Nor is it in physical science alone that these necessities have originated. All the early history and chronology of the world have involved similar divergencies from the inspired record; and it has required the most studious care to adjust and vindicate the system of the Bible, under the pressure of the objections which have thus arisen. The Hindoo and Chinese chronologies were long held to invalidate the Mosaic; and now that the debate has been satisfactorily concluded in reference to these, Egypt and

Ninevah come forward with their records, calling for an investigation far more elaborate, and one that shall decide with far higher authority, upon the correctness of the biblical narrative of the early history of mankind. I need scarcely say, that the Egyptian chronology, as given us by the concurrent authority of several very eminent names, is seriously at variance with the biblical scheme of history.

Deeper than all these lie two yet greater questions, on the decision of which, more than that of any other, depends, perhaps, the complexion of human thought. These are indicated by the words—scarce yet familiar even to intelligent hearers—teleology, and ætiology. The former takes cognizance of those facts and relations of physical nature which indicate to us the purposes for which objects exist—the *design* of their creation. The latter relates to inquiries for the *causes* and agencies by which the present system received its existence. They cover the whole vast field of nature through the remote past and the endless future; the origin, or causation, and the end, of nature and of man. An important school, chiefly of French philosophers and naturalists, has long been contending against the validity of the latter,—denying the legitimacy of all inquiry into the end for which modifications of animal structure might be supposed to take place. More recently the same denial has been very distinctly extended by the "positive" school in philosophy to the other of these inquiries—the method of their origination. In these two denials the controversy seems to reach

its climax. It is not a dispute about the sufficiency of an answer to the inquiry, *why* things are; but about the scientific legitimacy of any *inquiry* upon that point. The one party asks whence and why the earth and the soul came up out of the abyss of a past eternity; to what purpose they now exist, and whither they tend in the eternity to come; and to these questions it would give what best answer the scientific study of nature can furnish. The other party maintains that these are impossible and inadmissible problems,—that we have nothing to do save with such facts as exist at the present moment under our observation: that of what is so absolutely past, or absolutely future, as to be beyond the reach of observation in the present system, science can take no cognizance, and suffer no cognizance to *be* taken. This difference obviously brings us to the end of the controversy—there can be no strife beyond. When we take up the question whether the human mind has any right to inquire respecting that which breathes the breath of life, whence it came and why it exists, or whether we must be content with simply noting the fact, and the manner of its existence, we have reached the culminating point of this long movement.

Such a glance at the existing state of scientific philosophy, shows, beyond mistake, that far from being settled, the conflict of biblical and scientific theories is at present exceedingly active. Instead of being concentrated at one or two points, as in previous years, it extends over the whole field of scien-

tific research. It is abundantly evident, too, that such controversies can never be terminated till the whole of our globe has been thoroughly explored, and the system of nature is fully understood. As this cannot be the work of a day, the controversy must remain undecided, till future generations of scientific students shall have added their researches to ours, imposed their modifications upon our theories, and followed the path of inductive investigation to something like a full comprehension of nature.

After this somewhat extended reference to the questions in dispute, I shall not be suspected of any desire to undervalue the difficulties which must be encountered in every attempt to harmonize these two systems of thought. I may, therefore, with the more confidence beg a hearing, in the next place, for some considerations which may enable us to form a just estimate of the force and effect of these adverse reasonings.

II. It is obvious, then, that the religious system of the Scripture is in no respect prejudiced by any number of really *open* questions. As long as any philosophical doctrine is matter of debate upon scientific grounds, no influence can legitimately be drawn from it, no charge be sustained by it, of error in the Bible. Until its own standing is made good, and its truth placed beyond all scientific question, it obviously cannot be used to determine a question of truth or error in another system of doctrines which claims acknowledgment upon evidence of its own. Now this is conspicuously the position of the contro-

versy between science and the Scriptures. The numerous points of debate are not points of settled disagreement. Modifications of opinion, on either side, may remove the discrepancy. Many of the scientific views which now seem most decidedly hostile to our theological system, may yet be decided in harmony with its assumptions. Some of them, if we may base a prediction upon the experience of the past, undoubtedly will be so decided. So long, then, as this result is possible in respect to any scientific opinion, the validity of any religious views which may be at variance with it, remains unimpaired.

But not only is the authority of our faith unimpaired by this broad questioning of its claims; there is, moreover, an exceedingly interesting aspect about a religious system which occupies a position thus destitute of external support. Faith never seems more commanding than when it becomes so absorbing and intense, as to be utterly careless of the progress of philosophical opinions; so confident of its moral truthfulness, and of its heavenly wisdom and benefit, as to pursue its aim regardless what theories of science may censure its movements or reject its claims. When we take into view the whole scope of the broad field in which philosophical reasoning is at variance with the system of the Bible, and see that system energetically accomplishing its work through the whole earth, without the unfaltering support of a single science, and with the possible hostility of all sciences, it is impossible not to feel that this is a novel, a wonderful, and a most dignified,

position for any religious philosophy to occupy. Never before has such a case been known. There is scarcely one of this whole group of sciences, which could not overthrow with ease any other scheme of religious philosophy that the world ever saw. We feel at once that it is impossible to conceive of such a controversy between modern chemistry and the ancient cosmogony, with its four elements—earth, and air, and fire, and water. It would be out of the question for any religious theory of the solar and stellar universe to hold a dispute with modern astronomy; or for any mythological account of man's origin, any fantastic theory of autochthones, to stand for a moment against the conclusions of our ethnological and philological research. Any heathen mythology of our own age—any classical or barbarian mythology of the past, would be abandoned the moment its defenders had advanced so far as to gain the first idea of the extent and depth of scientific research. But the Bible! it stands, not against one science, but before all sciences. It maintains its great positions—each one of them liable to the freest scientific question, but each of them full of the highest moral interest,—and no fundamental idea of its great scheme of thought has grown obsolete with the growth of the human intellect, or been proved erroneous by the advance of knowledge. In the face of many a contemptuous question, many a profound objection, many an imposing theory of nature, it holds on its way. It confronts the whole body of science, demanding countenance from the

highest forms of human thought, and claiming homage from minds of the noblest cultivation.

This conflict of the revealed doctrine with scientific opinion seems in another aspect to be a peculiar characteristic of Christianity. In other systems, science has been in great part the exclusive possession of the priesthood. To cultivate occult and magical arts, to preserve a mysterious and esoteric knowledge, which might dignify religion in the eyes of the vulgar, have often been functions of the priestly office. The aid which such science could give, in imposing the superstitions of a false religion upon the popular mind, has been the only bond of union heretofore between the two. But in our day science is not confined to sacerdotal hands; the cultivation of it is no essential part of the office of the Christian teacher. She has altars, truths, temples, and ministers, of her own; and herself presents her claims, independent of any religious acknowledgment, upon the respect, and acceptance, of mankind. Now, whatever hostility there may be, there can be no collusion, between systems so diverse. Their absolute independence of each other, gives assurance that any harmony in which investigation may terminate, can be the result of nothing else than energy, freedom, and candor, in the study of nature, on the one side, and of the original inspiration of the Divine word, on the other.

This fact suggests a possible explanation of the extent of this wide and long discrepancy. The statements out of which these various debates have grown

are not always necessary to the system of revealed truth. The Mosaic narrative might have omitted much in respect to the method of creation, much in respect to the historical fact, which has now become the occasion of controversy. Revelation might have been communicated by means much less liable to scientific scrutiny. But these intimate relations seem to have entered into the very plan of the revelation. It has pleased God that the two systems should be closely connected with each other in their results, while they should be totally independent in their methods. While science proceeds from a standpoint in physical nature, is cultivated by a particular class of men, and reaches its results by inductive reasoning, theology must proceed from a starting point in the spiritual world, and under the guidance of a different class of persons, and by the use of different means of knowledge, reach conclusions of its own: and the harmony of the results shall attest both the legitimacy of the method, and the accuracy of the procedure, in each. Every conclusion which faith and science concur in affirming, shall possess an unquestionable claim upon our confidence; and each system shall stand the stronger for the support of the other,—as in the trigonometrical survey of a state, the last assurance of accuracy is obtained, only when one system of triangulations coincides with, and confirms, another.

In this view of the subject, the very dissimilarity of the methods of inquiry, and even whatever par-

tial, and temporary, opposition of opinions is consistent with ultimate agreement, contribute to the confirmation and security of the ascertained result. When each particular science shall have authenticated, and announced, its conclusions upon those topics by which it stands related to the Bible, the harmony of so many independent witnesses in affirming the truth of the Scriptural statement, will, if it can be attained, afford the world new and unanswerable evidence of the divine origin of the Bible. The more, therefore, of such independent witnesses, the better; the more of discrepancy and conflict in the steps by which harmony is ultimately attained, the better; the more dubious, and hopeless, even, of reconciliation, the incipient processes may seem, the better,—provided only that the harmony may be attained at last.

Our struggles and conflicts, discouraging and painful though they may be to us, shall enure to the benefit of those that shall come after us. We are too apt to look upon the Christianity of our day as ours,—as a thing to be settled and vindicated for our use; and to forget the more important reference of our inquiries, to the more populous and intelligent generation that is to succeed us. But as each previous generation has had its work to do in the explanation and defence of the Scriptures, so we have ours. As the struggles and toils of one generation have ever achieved a rich heritage of blessings for the next, we too may hope that our strifes will bear the rich fruit of assured conviction. As primi-

tive Christianity struggled with the heathenism of Greece and Rome — as Roman Christianity struggled with the invading barbarism of the north — as a revived Christianity struggled at a still later day against the superstitions of the middle ages, — so in our age the Gospel has its conflicts. And as the truth of God's revelation came forth, not dimmed and enfeebled, but invigorated and illustrated rather, from each successive strife of the long ages, so now in this new strife with the emancipated and matured intellect of the world, the history of the past encourages the hope of new victories, which shall be honorable, and useful, in proportion as the conflict has been arduous and protracted.

In view of such a result we may perhaps think that God has purposely prepared the way for all the contests which are in progress around us. Is it presumptuous to believe that for this reason Divine inspiration has mingled its words of scientific truth with the moral teachings of the Bible? May we not suppose that it is for this reason that astronomy, and geology, and zoology, and history, and every great movement of scientific inquiry, finds itself involved with passages and doctrines of the Word of God? The system which that inspired work reveals is not one remote from all that awakens the deep wonder, and earnest study, of the human soul. It has, and must have, intimate connection with each profound inquiry in the great fields of nature, and of history, which determines the course of human thought.

Instead, therefore, of wondering that science should be forever intruding upon his sacred domain, the Christian scholar who is not unworthy of his name, will expect to have his religious philosophy, tested by a scientific philosophy, of nature. Instead of rebuking the freedom of scientific thought as a presumption, he will acknowledge the legitimacy of all candid and reverent inquiry. While he feels constrained to censure the love of distinction which is ambitious of the reputation of scientific discovery, and that fondness for philosophical generalizations which sometimes seduces the student of nature from the path of laborious investigation, he will rejoice to see every science constrained to discuss the Bible, and will augur results of good from the discussion, proportionate to its thoroughness and depth.

Nor will this controversy enure to the benefit of religion alone. Science will find an unknown elevation both of its aims, and of its processes, in the high office which it thus subserves. It is the reproach of the science of our day, that it is compelled to deal with an endless detail of particulars. As the great laws of nature are successively discovered, the minor detail of verifications, exceptions, and modifications, becomes immense. Each minute characteristic of a species, down to the marking upon a fossil shell, acquires a certain importance; each petty modification of an organ, or a system of organs, must be borne in mind. The species, too, become more and more numerous as you descend into the lowest and most insignificant orders of organisms, till the detail

becomes endless and overpowering. Accordingly, in the judgment of a very eminent philosophical mind, M. Comte, it is an imminent danger of scientific men in our day, that they will be swallowed up in this vast ocean of particulars; that they will lose all comprehensiveness of mind, and power of generalization, in the multitude of isolated facts which they must acquire, and in the necessity that lies upon every one who would advance science, of working in some limited portion of the general field. He even proposes the institution of a new order of scientific men, whose chief effort shall be, abandoning the detail of investigation, to bring the several departments of science into relation with each other, and cherish thus the spirit of generalization. To one who has learned how indispensable a check habits of patient observation are upon the spirit of hasty and reckless generalization, the usefulness of the remedy may seem very questionable; but the suggestion of it indicates a real and obvious danger of every extended science; and indicates also that the danger is beginning to be felt by those who are exclusively the devotees of science. Every thing, therefore, which tends to connect this multiplicity of observed phenomena, with great principles of thought, is of the highest value to science, as supplying an additional element of comprehensiveness to counterbalance the growing deficiency.

But in the relations which every field of natural history has to the Bible, a new order of the grandest questions comes to view. If our studies in each de-

partment bear upon the origin of the human race, the diffusion of that race over the globe, the unity and brotherhood of our species, upon the creative act of God, upon the identity of a species in the world, then the meanest fact has a weight and dignity which the greatest could not otherwise possess. The thistle seed which floats in the summer breeze, exemplifies the agencies by which man's distribution over the globe was accomplished—suggests the common brotherhood of men, and their common relation to God,—and represents, in one of its highest features, the grand plan of the organic world. However insignificant in themselves, the details which stand in such relations, they have a real value and importance which make them worthy of our most careful investigation. But if the facts of science sustain no such high relations—if they are destitute of any bearing upon the grand topics of man's highest concern, what title have they longer to the attention of earnest and elevated minds? How shall the great thinker turn from the high problems of man's destiny to discriminate the four thousand weevils which constitute but one of the numerous families of the entomologist? How shall any earnest and practical community feel an interest in such investigations? How shall such inquiries vindicate their claim to the life-long study which they demand?

In this respect science has never yet sufficiently recognized its obligations to the Bible. It has not been adequately understood how great a part of all the interest at present felt in scientific pursuits arises

out of their religious bearings. How much, for instance, of the interest now so generally felt in geological speculations and observations, depends upon their connection with the Mosaic narrative of the creation! In some forms of investigation this religious connection of the facts is actually the predominant impulse to inquiry. The relation of the Egyptian and Assyrian remains to the chronology and history of the Old Testament, is the chief reason of the intense curiosity with which those obscure and mysterious antiquities are pondered in every quarter of the globe. Without this, there would remain no general stimulus to such inquiries; the languid and limited interest of a small circle of learned antiquaries, would alone remain to pursue, to esteem, or to reward investigation. In some branches of science the religious relation absorbs every other, and becomes almost the exclusive element of interest. This is conspicuously true of ethnographical inquiries. What adequate scientific motive would there be for investigating each barbarous jargon that forms the language of a savage tribe, if human language was only an independent growth in each soil and clime of the earth? But if each language is an off-shoot of the one primitive stock, then to trace this connection with other tongues, even in the most barren dialect, is an achievement of interest and value; and the dryest details of philology become rich with instruction. In the same manner, if each distinct and peculiar race of men, and each remote and isolated population, are the children of a common parentage,

with all the rest, then — to say nothing of the high moral interests which seek such a conclusion directly supports — to follow their migrations, and explain their changes, is a philosophical study worthy our utmost attention, and fruitful of advantage and delight.

It is often said by scientific men, that only a meagre and unworthy interest is felt by the public, in their ennobling pursuits; and that the purest and highest science is generally accounted of but little worth, in comparison with the commonest utilities of life. The charge is a just one; material and practical interests do engage the public attention, and turn it away from the more elevating walks of knowledge. But let science understand whence arises that measure of interest which *is* so generally felt by the public in her field. Let her not fail to perceive how efficient an auxiliary the Bible has thus become, to her cherished pursuits. In this view it seems not unreasonable to think, that could science unhappily repel the Bible from its present place of confidence and love in the bosom of society, a very great part of the interest which now supports science itself, would perish as the consequence. By a hostility so profane, science would work out its own retribution in the moment of its success. Subverting that religious system which has been the intellectual, as well as the moral life of the world, through the whole period in which modern science has been developing, it would destroy that which chiefly dignifies its own obscure and minute researches, and gives interest to

the results which it ascertains. Many a question that now awakens the earnest curiosity of inquiring minds, would cease to possess attraction; and the hostility which was first fatal to religion, would next rob science of all its worth, destroy its highest claims upon public regard, and separate it, one knows not how far, from the sympathies of the world that it had materialized and degraded.

The relations, therefore, out of which these conflicts grow, have perhaps been ordained in the interest of science, as well as of religion. The Word of God has connections with philosophical views of nature, in order that it may supply to the public mind universally an element of interest in all scientific inquiries; and may even commend those inquiries to the most earnest students of man's relation to nature, and to God.

This relation of mutual advantage, which might be much farther illustrated, affords a cheering presage of the ultimate harmony between faith and science. It cannot be that two systems of thought which are so adapted to develop, and benefit, each other, should be intrinsically hostile. Let science, then, define and enlarge our theological conceptions of nature and of man; let it introduce an accuracy, and an expansion, of thought on these subjects, which theology alone could never attain. Such benefits theology shall gratefully recognize, and estimate at no trifling value. Nor shall they fail to be generously repaid in the elevation and dignity which such relations will impart to the scientific process.

Each petty detail of observations, each register of minutiæ which else had been insignificant, and wearisome, shall become instinct with life, and fertile of advantage, as it derives significance and importance from its relation to the Bible, and authenticates with new evidence the record of inspiration.

But is there any real prospect of such ultimate agreement, or are we to apprehend a serious conflict of intelligent conclusions? On such a question I am not entitled to indulge either the good natured hopes of those who love peace, or the confident predictions which may be offered for either opinion. Our conclusion can be drawn only from a survey of the past tendencies of the discussion, to which I will devote the remaining space of this essay.

III. It may be observed, then, that all previous discussions have either been concluded in some conformity with the statements of the Bible, or they have resolved themselves into broader questions of philosophical principle which yet remain to be decided. One or two illustrations of this remark will, I think, vindicate its correctness.

For the first case, then, we have many issues of fact, upon which scientific inquiry has for a time been in conflict with the Scriptures, but which have ultimately been decided in conformity with revelation. An illustration of this tendency is furnished by the biblical chronology. Again and again some system of antiquity, or some physical facts, have here been scientifically arrayed in opposition to the system of the Scriptures; but every former attempt

had only served to confirm the scheme it was designed to invalidate. The world had learned to feel that although the biblical scheme of history was not free from difficulty, and did not enable us to pronounce with confidence even upon the respective claims of the Hebrew and Greek exemplars of it, it was yet far more worthy of respect, and reliance, than anything which scientific research could substitute in its place. The Egyptian investigations of Lepsins, however, have at length brought the controversy to a decisive issue; and presented a body of reasonings which affirm results altogether irreconcileable with any chronology deducible from the Mosaic books, in whatever form. This distinguished scholar carries back the chronology to a date 3893 B. C., at which point he places the founding of the Egyptian monarchy by Menes. This determination is accepted by Humboldt in his Cosmos; and he claims another thousand years anterior, for the growth of the civilization out of which the Egyptian empire sprang: while Bunsen is understood to extend the duration of the Egyptian monumental history, over a period of five thousand years.

It can scarcely be necessary for me to say that the weight of these great names gives to their conclusions an authority never before attained in this field.

Arrogant as it may seem, to call in question the general correctness of a scheme supported by such eminent scholarship, the more recent, and more complete investigations of an English student, Poole, have given a very different aspect to the subject.

His discovery of several periods, or cycles of years, in the Egyptian method of computation, has thrown a very unexpected light upon the chronology of the monuments. Besides the inherent credibility of a scheme which interprets sculptures that before were entirely unintelligible, this writer has discovered a method of verifying his conclusions which affords the ground for a confident reliance upon all the facts to which it is applicable. The sculptured ceiling of the Memnonium of Thebes records certain astronomical phenomena which admit of being determined with the absolute accuracy of mathematical calculation. Computations of this kind, made by Mr. Poole himself, have subsequently been revised at the Royal Observatory at Greenwich; and are now authenticated by the highest British authority, Prof. Airy, as entirely reliable. Upon data of this kind, which connect certain events recorded upon the monuments with several conjunctions of astronomical phenomena, Mr. Poole has established a system of Egyptian chronology which seems beyond question more authentic than any which had preceded it; if we may judge from the harmony that he introduces of all ancient authorities. His results establish the full correctness of Manetho's lists, which, however, he shows to be those of contemporary dynasties; and upon a comprehensive survey of all the remains of antiquity, he places the accession of Menes and the foundation of the Egyptian empire in the year 2714 B. C. When in addition to these facts, we find that the application of the theory carries a

similar line of light down through the subsequent history of the Hebrew nation, confirming and explaning some of its most remarkable events, it is impossible not to feel that the crisis of this debate is now passed; and that the numerous, and long-vexed, questions which have perplexed inquirers into the early history of the world, are at last approaching a settlement in harmony with the Mosaic record.*

*As Mr. Poole's investigations are but little known yet in this country, it has been suggested to me that some brief extracts from his work might be generally acceptable. I present, therefore, a few passages from the Horæ Egyptiacæ, as originally published by the author in the London Literary Gazette, for 1849.

"The first subject of the following investigation has employed the pens of several learned and ingenious writers. It has been shown to be a record of great historical value, as indicating the period of the reign of Rameses II; but beyond this I know not of its having hitherto afforded any useful information to the chronologer or historian. A careful examination, however, has shown me that it also affords some data for fixing other points of the ancient Egyptian chronology, one of which is far more important than that of the reign of Rameses II; being a period more remote, and one respecting which approved writers have so greatly differed that some have removed it about a thousand years higher than others; and in addition that it enables us to determine some of the ancient divisions of time."

"The subject to which I refer is the sculptured ceiling of the celebrated temple at Thebes, commonly called the Memnonium, but properly, the Rameseum of El Kurneh. It is oblong, and contains three longitudinal divisions, surrounded by a narrow border of hieroglyphics." * * *

"The first division of the table, for we may so call it, exhibits the coincidence of points of a vague year with certain astronomical phenomena; and part of the second division relates to the same subject."

"These data determine the existence of a luni-solar cycle of 1499 tropical years, corresponding to 1500 vague years of the Egyptians, and dating from a period at which the vernal equinox coincided with the day of the new moon. By the most careful calculation, I find that in the year B. C. 506, at the new moon which fell on the 27th March, at Sais, there was so near a coincidence between the new moon and the vernal equinox that both fell on the same day; hence we obtain the commencement of a second great Rok-h cycle, or luni-solar cycle, Dec. 28th, Julian, B. C. 507. That of the first is of course easily to be obtained, as the coincidence would occur every 1500 vague years."

A similar tendency is discernible in respect to the great question in natural history, of the origination of organic life. While theories of such origination are maintained by physical philosophers in all the European schools, the only really accurate experiment, —that of Schulze, of Berlin—decisively indicates an

"We thus obtain from the Egyptian monuments two fixed dates; the commencement of the first luni-solar cycle, Jan. 7, B. C. 2005, in the reign of Amenemha II; and the commencement of the second luni-solar cycle, Dec. 28, B. C. 507, in the time of the Viceroy son of Amasis. These dates are in every way agreeable with history, sacred and profane, as well as with the whole tenor of the Egyptian monuments, and nearly with the chronological systems of the much regretted Champollion and Rosellini."

Pursuing his computations with great ingenuity and care, Mr. Poole observes: "The monuments, therefore, in my opinion, enable us to fix with great exactness six dates, and a seventh with probability. Of the six fixed dates, the first belongs to the very ancient period from Menes to the Shepherd invasion; the second to the period from the Shepherd invasion to the 18th dynasty; the third to the period of the 18th dynasty; the fourth and fifth to the 26th dynasty; and the sixth to the 27th dynasty."

Of the remaining probable date, this author says: "The commencement of the first great panegyrical year B. C. 2714-15, or 365 years before the date of Suphis I, since it does not, so far as I know, point to any remarkable astronomical period, must I think be a great national epoch. I have assumed that this is the commencement of the first, because if we make another such period to have preceded this, we should refer its commencement to an age far anterior to any indicated by the monuments, and far anterior also to the earliest that can be assigned to the dispersion. This epoch may perhaps be that of Menes. I should not have dwelt so long on this date and that of Suphis I, but for their great importance as fixing the times of the fourth and fifth dynasties, and the age of the erection of the greatest existing monuments of ancient times, and ennabling us to form a more accurate notion than we otherwise could, of the time of Menes, and of the commencement of the Egyptian kingdom. These dates, as will be shown in a future place, are perfectly in accordance with the Septuagint chronology."

From monumental data Mr. P. fixes the date of the Exodus at B. C. 1652, a date which derives confirmation from its close coincidence with the date assigned to that event by Dr. Hales, who places it in B. C. 1648. After showing the probability that the Israelites adopted the common Egyptian months, he remarks that if this opinion is correct,

opposite result. This ingenious inquirer, in order to test the question of the origination of low forms of life under such circumstances, prepared an infusion of animal and vegetable substances in distilled water, and elaborately secured it against all intrusion of the atmosphere, by which the minute germs of these organisms are generally diffused. While a similar infusion in the immediate vicinity abounded from the second day, with both animal and vegetable infusoria, the guarded solution remained for the whole summer, perfectly free from every trace of organic life. An experiment made with such absolute completeness as to have induced Owen to pronounce it "the only experiment in which all the difficulties appear to have been fully overcome," may claim an influence in determining our belief to which no theoretical conclusions can justly pretend.*

the day of the Exodus, which was the 14th Abib, should correspond to the 14th Phamenoth; and that on this day there must have been a full moon. This event an accurate computation shows to have taken place. "Thus," says Mr. P. "we have a corroboration of my opinion, together with an indication of the exact year and even day—Thursday, 21st April; and the two coincidences are such as could not occur again, unless after an interval of 1500 years." * *

"A great passover is reported to have been celebrated by king Josiah, in the 18th year of his reign; and it is also stated that none so great had been celebrated since the days of Samuel the prophet. Now the preceding arguments would place the Exodus in the year 1652, and the settlement of the Israelites in the conquered lands B. C. 1605, which would be the first year of their great Sabbatical period. Counting 70 Sabbatical years, or 10 jubilees, i. e. 490 years, or 70 times 7 years, we come down to the jubilee year 1115 B. C., which was in the time when Samuel was judge. Again counting 490 years from this last mentioned year, we come to B. C. 625, the year in which commenced the civil year of which the passover fell B. C. 624, in the 18th year of Josiah, according to Usher."—*Literary Gazette, p.* 641.

*Of this experiment of Prof. Shultze, Owen gives the following account: "He filled a glass flask half full of distilled water, in which

In many departments of zoology this question has been the subject of careful study; and at every point the theory of spontaneous generation has given way before inquiry. Even the minute and low organisms which are parasitic upon, or within, the higher animals,—the origin of which was so long utterly inexplicable,—have yielded their secret at last. The discovery of their methods of reproduction, of their unparalleled fecundity—of the surprising changes of form which many of them undergo—and especially of the very peculiar fact, in some instances, of their alternation of generations entirely dissimilar—and also of their capacity of penetrating the tissues, and even of entering into the circulation, of the animals upon which they habitually subsist, has given ample illustration of many difficulties which had

were mixed various animal and vegetable substances. It was then closed with a good cork, through which were passed two tubes bent at right angles; the whole being air-tight. It was next placed in a sand bath and heated till the water boiled violently. While the watery vapor was escaping by the tubes, Prof. S. fastened at each end an apparatus which chemists employ for collecting carbonic acid; that at one end was filled with concentrated sulphuric acid, the other with a solution of potash. The apparatus was then exposed to the influence of summer light and heat; and at the same time there was placed near it an open vessel with the same substances which had been introduced into the flask, and also after having subjected them to a boiling temperature." The air was daily renewed, by passing it through the sulphuric acid; and the process continued from 28th May, to the beginning of August, "without Prof. S. being able by the microscope to discover any living animal or vegetable substances; and when at last he separated the parts of the apparatus, he could not find in the whole liquid the slightest trace of infusoria, or confervæ, or of mould; but *all* these presented themselves in great abundance a few days after he had left the flask standing open. The vessel which he had placed near the apparatus, contained on the following day vibriones and monads, to which were soon added large Polygastric Infusoria, and afterwards Rotifera.—Owen—*Comparative Anatomy and Physiology of the Invertebrata.*

long eluded our research, and which threatened to baffle all investigation. So many problems—the most impracticable as it seemed—have been at length resolved, that no allegation of new difficulties can well bring the explanation of the remaining facts into serious question. Scientifically, it is altogether probable that no species of animal, even the lowest, is at present spontaneously originated. Even under the limitation which confines this creative process to the reproduction of existing forms of life, the work of creation does not go on in our day.

These illustrations may serve to indicate a great and general tendency of discussion, in respect to those specific questions which can be finally issued in the present state of our knowledge. Many others might be added, such as the early origin of alphabetic writing, the absolute unity of the human family, the original identity of human language, and numerous questions in the history of the remote past, which fall under the same general head; and which show that within this field some real advances have already been made toward a harmonious settlement of the points in dispute.

The other aspect of this tendency, in which specific diversities resolve themselves into broader questions of philosophical principle, is illustrated in the progress of modern astronomy. The earlier developments of this science supplied materials for a variety of objections against the biblical theory of creation; and at length when the theory of the planetary motions became complete, and the compensatory

character of the irregularities was fully proved, the system seemed to wear an aspect of permanence altogether at war with the idea of such a series of creative arrangements as the Mosaic narrative recounts. It seemed as though so complete a system of revolutions might have been moving on from eternity, and would continue its harmonious course through the eternal ages to come. The further prosecution of inquiry, however, has resulted in a scientific hypothesis of creation which has completely displaced every such objection. The nebular theory—the only scientific hypothesis which can now be formed, and one which it is reserved for future discoveries to adjudicate—overthrows every idea of stability in the past history of the heavens. It points out changes, in a long and great series, which distinctly had a beginning. The mind is irresistibly referred by it to a point at which a grand system of changes began to take place, and a body of new laws began to operate,—for which only the creative act of some agent extraneous to the physical universe itself, can account. It is remarkable that this theory, which disagrees with the Mosaic cosmogony only in the unessential interpretation of its periods, should conform to it in every other great element. It involves the existence of light before the creation of the sun, and the organization of the outer before that of the central orbs. It refers all the existing adjustments of this ample universe to the operation of one great system of laws, and proclaims thus the absolute unity and infinity of the controling force. In order, too,

to render any account of its action at the time and in the manner which science describes, it is constrained to attribute to this force the wisdom and the freedom which mark it as an intelligent and designing mind. And yet this system, which suffers a conformity, and lends a support, to the Bible, that no other could, was designed as the last perfection of a scheme of Atheism which should utterly exclude the Creator from His works.

Geology affords another example of the same result. Whatever conflict there may yet be upon particulars of the Mosaic narrative, there can be no question of the singular conformity of science to Scripture in respect to the recent origin of man upon the globe—to the contemporaneous creation of the fruits, grains and animals, the possession of which characterizes the civilized state—and to the general order of the creation. Moreover, the grand and marvelous changes in the history of our globe, which geology reveals, effectually forbid all the argument against miraculous interpositions, which once was drawn so confidently from the absolute immutability of the laws of Nature.

In instances of this kind, if the specific points of the received interpretation of the Bible, are not supported by science, they are shown to be immaterial to either scheme; and the whole interest of the controversy gathers about the high principles of thought which are irresistibly suggested by its progress. Not only are those principles seen to underlie, as a foundation, the structure of science, but they receive,

in the course of its development, an illustration so new, and so ample, as to implant them yet more deep in the believing mind, and to show science and revelation the work of one wise and mighty author. They communicate to the simple and narrow facts of revelation that expanded and philosophical character which only ensures for them a more confident, and intelligent, and universal acceptance.

Judging, then, from the tendency, past and present, of investigation, there seems little reason to apprehend any ultimate collision of these authorities. Since we have hitherto found that, in one or other of these ways, all accurate investigation lends confirmation to the Scriptures, any expectation of an opposite result hereafter, seems unauthorized.

In respect, however, to the principles which shall control the prosecution, and guide the aims, of science, there is a controversy which can never be harmonized; and which can end only in the overthrow of one or the other of the opposing claims. Shall science take cognizance of any design in nature, and admit any inquiry in respect to its author?

A very interesting aspect of the first of these questions was that presented by the discussion between Cuvier and St. Hilaire. The latter author contended that he knew no such thing as a design in nature; and entirely refused to recognize in science what has been termed a final cause—an end for which any object exists. The other adopted and defended the principle that there is an intelligible reason for each modification of an organic structure; and con-

tended that every change is for the purpose of adapting the animal to what he termed its "conditions of existence." The splendid results of Cuvier's labors in fossil geology afford ample vindication of his method of procedure, and attest the necessity of his principle in order to any adequate or even intelligent conception of the arrangements of the organic world. Assuming that each modification of a bone had an intelligible relation to the general economy of the animal of which it had formed a part, he deduced the entire structure from the peculiarities of any important part, as the skull, or the teeth. When the subsequent discovery of a perfect skeleton afforded an opportunity of comparison, the marvelous accuracy of this theoretical delineation gave a conclusive refutation to all objections against the principle by which it had been gained. The attestation which it affords of the practical correctness and value of this grand principle of Cuvier's philosophy of science, is quite analogous to that which Le Verrier's discovery of the planet Neptune gave to the correctness of our theory of the planetary motions; and when we remember that it was a pioneer effort in a new field—that it extended to some forty species of extinct quadrupeds—and that it gave to the world the first decisive proof of the startling changes which organic nature has undergone in the history of our orb; it seems impossible to withhold our profoundest acknowledgment of the scientific value of the principle which guided successfully so great an achievement.

So marked was the effect produced by this brilliant effort of the great French naturalist, and so decisive its bearing upon the controversy which it illustrated, that the debate has not, since his day, been revived in the same form by any eminent authority. At present it may be considered as having given place to that offered by M. Comte, the eminent leader of the positive school in French philosophy. Even upon him its effect is obvious. He is led to censure the prevalent atheism as inadequate to the conflict which it has undertaken; and deems it impossible to maintain the debate against the indications of a designing cause. Laying aside every attempt to account for them, therefore, he rules out the whole controversy as inadmissible in science. The conception of a cause belongs upon his theory only to an immature state of the human mind, and hence every inquiry for either a cause or an end is necessarily excluded from our philosophy. The production of phenomena he declares to be "an insoluble mystery" which it is not the object of science to explain; and fairly makes the admission, that so long as the question is entertained at all, and so long as the possibility of any answer is admitted, the theological one which refers all things to the will of an eternal cause, is preferable to any other which it is possible to devise. He seeks, therefore, to close the inquiry, and limit science to the simple observation of phenomena. He expressly defines its aims to be the determination of the *how* rather than of the *why;*

the determination of laws, rather than the discovery of causes.*

That such a form of science is irreconcileable with all religious views, it needs no argument to prove. It is so, simply because it was designed to be so,—so shaped that it might and should be hostile to all theism. But it is so by no intellectual necessity, and by no philosophical right. Indeed, such a disagreement serves only to mark more distinctly the harmony which does subsist between the religious and the scientific views of nature; and to show that a new philosophy of science itself must be adopted, before a thoroughly anti-religious character can be successfully communicated to it. The controversy here becomes one respecting the very rights and dignities of the mind itself,—one in which religion offers all its support to the claim for intellectual freedom. May the mind inquire for reasons and causes in nature, or is such inquiry illegitimate? Are we at liberty to take cognizance of a plan, to remark a design in nature, or are such inquiries to be excluded as puerile, and infantile, and unworthy, of notice? Is

*Mr. Comte uses the following language in his most recent work, the "Ensemble du positivisme": "When we wish to penetrate the insoluble mystery of the essential production of phenomena, we can suppose nothing more satisfactory than to attribute them to wills, internal or external, since we thus assimilate them to the daily effects of the impulses which animate us. Metaphysical or scientific pride alone has been able to persuade the atheists that their vague hypotheses on such a subject are truly superior to that direct assimilation which alone should satisfy our understanding, until it has recognized the radical emptiness and the entire uselessness of every absolute research."—*p.* 47, *Syst. de Politique Positive.*

The passage is well worthy of perusal, as containing even yet more distinct and significant statements of the same kind.

science to have a free and ample field of investigation, and to move in it unrestricted by *any* limitation, or is this philosophy which so rightly names itself "the positive" to impose an *a priori* limit, and forbid science to pursue any researches, or form any conclusions, beyond that barrier?

Such inquiries can have but one answer. The methods by which Cuvier gave the world its first insight into the organic wonders of its past history, and which, to this very hour, are illustrated by every effort of his only rival in comparative anatomy, Owen, cannot be lightly abandoned. The dictum of a philosophical scheme which happens to require the sacrifice, can be no sufficient authority, and the exclusion of God from the realms of human thought can be no sufficient end, for the abandonment of all that has most served to promote, and to adorn, the progress of science. None, save that Divine authority which it is the object of this system to overthrow, may thus presume to "set bounds about" the sacred mount of knowledge, and forbid the people to "break through unto the Lord to gaze."

Nay: if the battle is to be fought on *this* ground, it is nearer to its end than there had otherwise been reason to hope. Science cannot acquiesce in such humiliating conditions without absolute and everlasting degradation. If it can consent to pursue its researches under a disqualification like this,—forbidden to announce any conclusions, or even to entertain any inquiries, respecting either the origin or the end of nature's adjustments,—the freedom,

which now commends it to the acceptance of mankind, is forever gone. That can be no interpreter of nature which both renounces, and forbids, all investigation of the highest relation of nature. Science will be false to her high origin as the offspring of the reasoning and intelligent mind of man, when it shall decline the inquiry whether there is any intelligence in the fair face of nature. If, in order to divorce itself from religion, science must sacrifice all honorable freedom of thought, and all high inquiries, and sink to the mere registration of phenomena of sensation, the suicidal character of the sacrifice were itself a conclusive suggestion against the scheme which demands it. What more decisive indication could be furnished of the essential and eternal harmony of reason with religion, of human wisdom with the wisdom of God? When science can neither shed light nor receive light on the great questions of the origin and the end of nature, and of man, so ignominious a surrender of all that now gives it dignity, will render the direction of its conclusions a matter of but the smallest concern. Thus to retreat into the realms of "chaos and old night," would be but to acknowledge the superior merit of the antagonist to which so grand a field is deliberately relinquished. When science can discern no reason why the world is as it is, and tolerate no inquiry into the cause or the design of its existence,—when instead of helping to dissipate that darkness through which the soul ever seeks to grope its way to some discernment of its Author and its destiny, it shall be the chief attain-

ment of philosophy to censure all such high endeavor as puerile, and to lay the rude hand of restraint upon the mouth of inquiry, no adverse influence of religion will be requisite to consign it to the oblivion to which weakness and presumption ever find their spontaneous and speedy way.

It should seem, then, gratuitous to anticipate any permanent and serious conflict between the teachings of these two great volumes which together comprise God's disclosures of Himself to man. Framed alike in the depths of His infinite wisdom, there is material for endless study and discovery in each; and wide as the discrepancies of our earlier readings may be, the whole experience of this progress assures us that ultimately they shall confirm and illustrate each other.

There is a predicted era of general peace,—when the nations shall change their weapons of offence into implements of industry, and learn war no more. Shall we not hope that this beautiful harmony may extend also over the realm of thought; and that these long contentions of philosophy and piety, these sharp questionings of each other's claims, may subside into the willing and mutual recognition of rights. Resting in so cheering a hope, we shall contend,—so long as the contention seems inevitable—in that generous spirit of gallant foes, which, cannot bear to consider war as our permanent and settled policy toward an opponent whose manly and noble bearing gives him such a claim upon our respect; and which therefore would scorn to do in the

excitement of hostilities, anything that might prolong the unavoidable animosities of war into the anticipated and approaching days of peace.

How beautiful that ultimate agreement will be, when our theology shall have received its last modification from the maturest efforts of human inquiry, —when science shall have found the deepest certainty, and the highest dignity, of its truths in their relations to the Word of God,—when together they shall uphold all that is most essential to man's highest welfare,—and when they shall unite to discover, and to disclose, in nature, the work of an Almighty Power, under the guidance of Infinite Wisdom, and for the purposes of Infinite Love !